ALL THE WATER IN THE WORLD

Objectives:

Using this Project WILD activity, students will:

- be able to calculate the percentage of freshwater available for human use
- explain why water is a limited resource.

Materials:

- 1-L container (a soda bottle will work)
- 100-ml graduated cylinder
- eyedropper
- ice cube tray
- small container (another dish will work)
- colored markers
- drawing paper
- salt

Background:

Students may know the earth is covered mainly by water, but they may not realize that only a small fraction is available for human consumption. Learning that water is a limited resource helps students appreciate the need to use water resources wisely and to protect wetlands, watersheds, caves, and groundwater.

Procedure:

- 1. Tell the students that they are going to estimate the proportion of drinkable (potable) and non-potable water on the planet. Discuss what makes water unavailable for human consumption. (Saltwater, water trapped in glaciers, pollution, etc.)
- 2. Break students into small groups. Have each group draw a large circle with a marker on a white sheet of paper.
- 3. Have each group draw a pie chart showing their estimates of potable and nonpotable water.
- 4. Show the class a liter of water and tell them it represents all the water in the world. Ask where most of the water on earth is located (the oceans). Refer to a globe or map if necessary. Pour 30 ml of the water into a 100-ml graduated cylinder. This represents the earth's freshwater, about 3 percent of the total. Put salt into the remaining 970 ml to simulate water found in oceans, unfit for human consumption.
- 5. Ask where most of the remaining water might be. Almost 80 percent of the earth's freshwater is frozen in ice caps and glaciers. Pour 6 ml of fresh water into a small dish and place the rest (24 ml) in an ice tray. The water in the dish (around 0.6 percent of the total) represents non-frozen freshwater.
- 6. Ask students where some of the rest of the water might be trapped. 4.5 ml of the water is underground. Fifty percent of the people in the United States get their drinking water from underground wells, but not all of the groundwater is reachable.



- 7. Using an eyedropper, remove a single drop of water (0.003 ml) from the dish and drop it into someone's hand. This represents clean, fresh surface water (from lakes and streams) which is not polluted or otherwise unavailable for use. This is about 0.00003 percent of the total! This precious drop must be managed properly.
- 8. Ask students to compare their original pie graph of the dispersal of water with what they just learned.

Wrap up:

Discuss the results of the demonstration. At this point students should conclude that a very small amount of water is available for human use. Remind the class of their earlier guesses at how much water is available to humans and compare with the actual percent available. Have students explain their reasoning for their initial estimates. Discuss whether there is enough water available for the current population. There is 8.4 million liters of water available for the 6 billion people on earth. Theoretically, this exceeds the amount of water one person would require in a lifetime. So, why does more than one third of the population not have access to clean water? Discuss the main factors affecting water distribution on earth. Students can also consider that other organisms use water, too. Discuss what the class can do with the water used in this demonstration to keep from wasting it.

